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# Mississippi Proposed Calibration

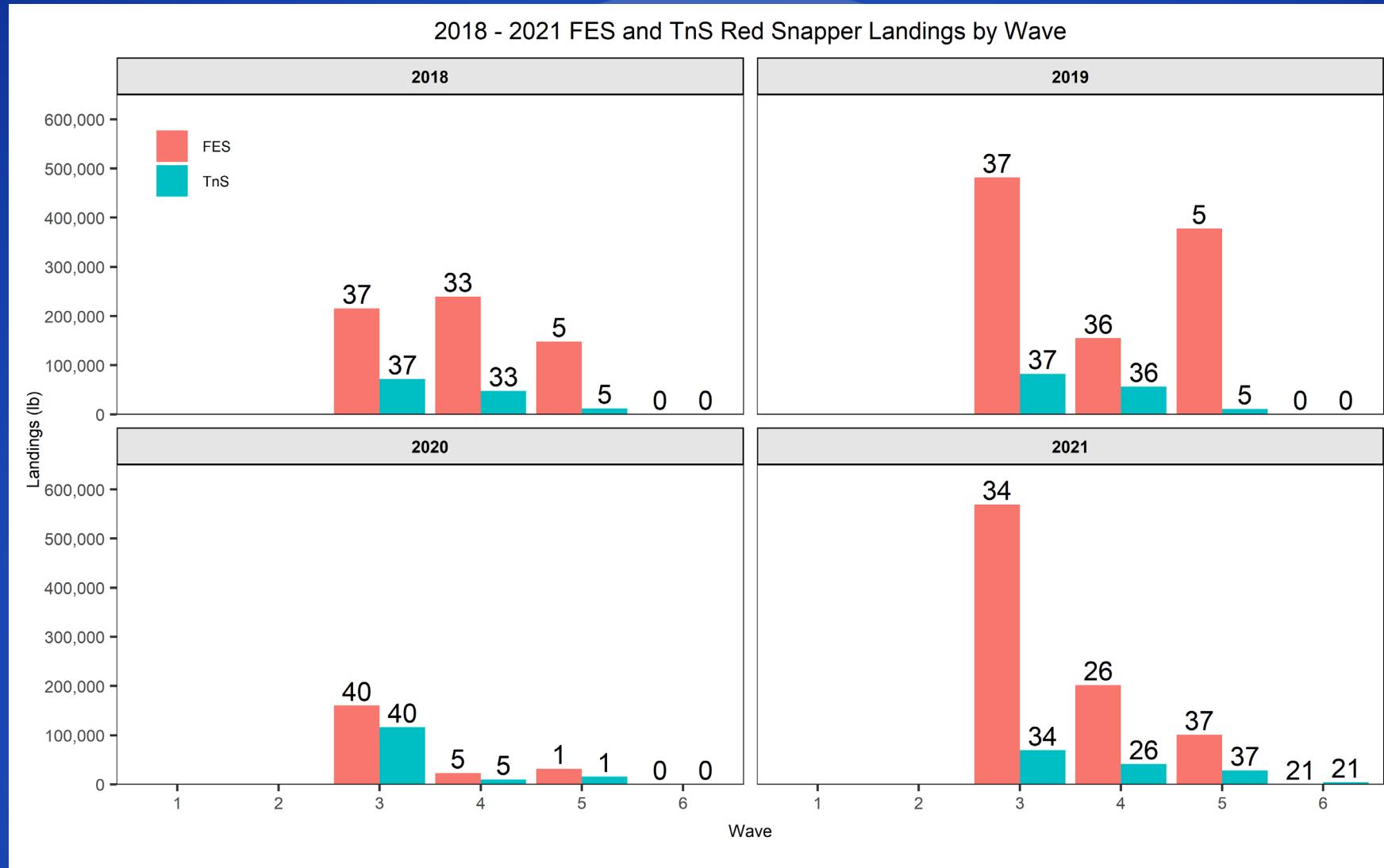
Mississippi Department of Marine Resources



# Background

- Previous calibration used estimates from 2018 and 2019
  - Hesitance with presence of Wave 1 estimates
  - Similar season length and distribution of fishing days within waves compared to previous years
- Current proposal was designed based on observations of patterns of MRIP estimates and concern in their accuracy
  - Limit calibration to high use waves (3 and 4)
  - Use estimates from 2018 – 2020

# Comparison of Estimates



Data labels are the # of fishing days within the corresponding waves

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# Justification of Proposal

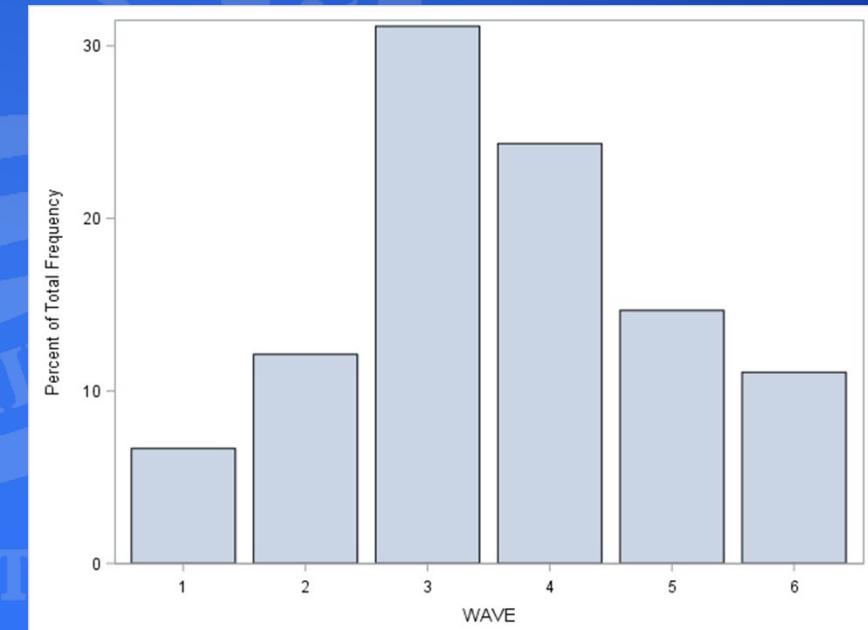
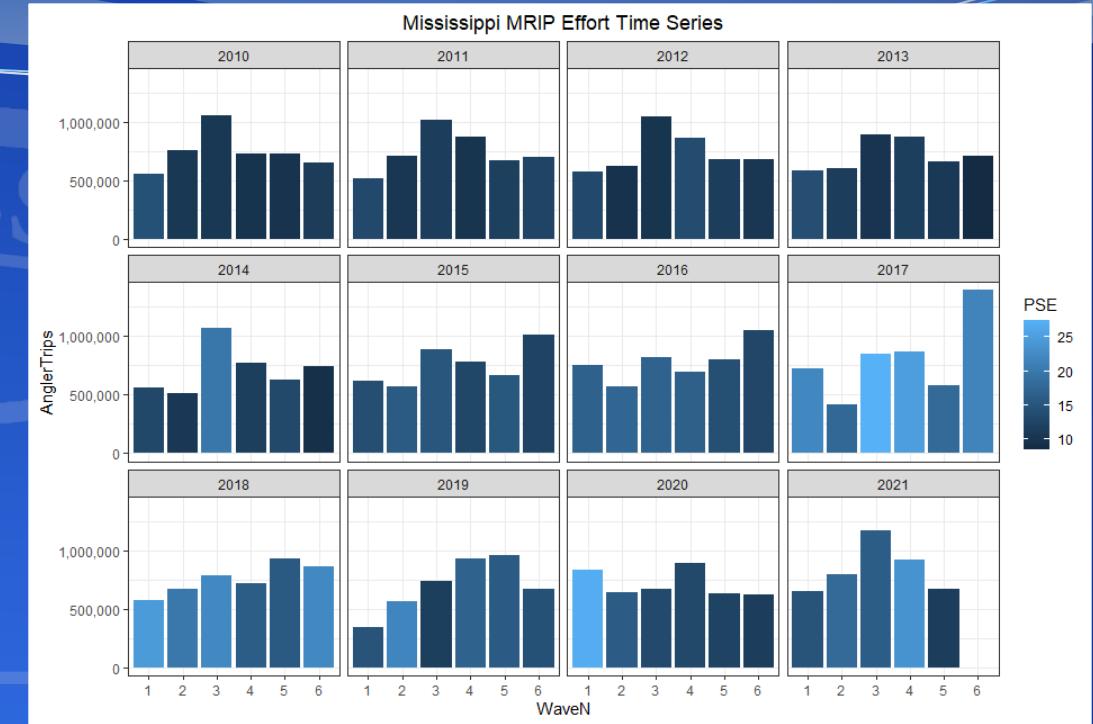
- Limiting comparison to waves 3 and 4
  - Waves in which the Red Snapper fishery does not primarily occur are subject to larger disparities in estimates
    - This likely is associated with smaller #s of completed surveys (as shown later)
- Using 2018 – 2020 and excluding 2021
  - Despite occurring during the primetime of the season, wave 3 continues to show volatility that is unexplainable
  - As a compromise, we have chosen to use 3 of the 4 available years to lessen the impact of the large magnitude wave 3 estimates that occur in 2 of the 4 years

# MRIP Effort and MS Recreational License Data

- Newly derived effort estimates using the Fishing Effort Survey potentially represent a significant overestimation of angler effort
- Ground truthing estimates using common sense approaches
  - ~80,000 licensed anglers in Mississippi each year (all rec licenses)
  - In order to reach the MRIP trip estimate (4.5 Million), each angler in MS would need to take on average 57 fishing trips per year (~5 trips/month)
- Ramp Capacity – 34 public launch sites with 882 boat trailer parking spots
  - Total number of Private boat trips if every ramp was at full capacity 365 days of the year – 1,020,600 angler trips (3.17 anglers/vessel assumed)
  - If we account for 30% of trips from private docks estimate is 1,326,779 angler trips
  - Estimate is still under the MRIP estimate of 1,563,070 angler trips from private boats

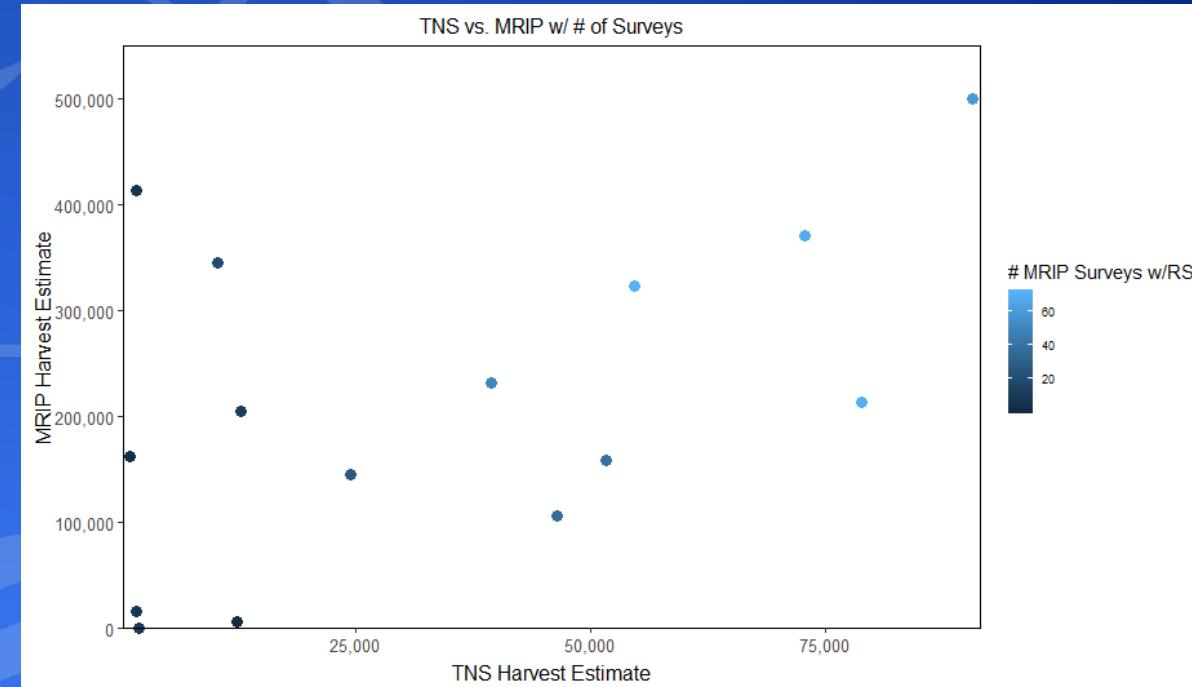
# MRIP Effort Estimates

- Consistency issues with distributions of fishing effort observed over time
  - 2010 – 2015 (CHTS) we see normal distribution of effort by wave
  - 2015 – 2017 (CHTS/FES) we see spikes in waves 1 and 6 (MS season closed)
    - Spikes in wave 1 likely contribute to the Red Snapper estimates for those years
  - 2018 to 2021 (FES) we see a different distribution pattern each year
- Weighted APAIS intercept distribution from 2015 – 2019 appropriately represent seasonal variation in effort



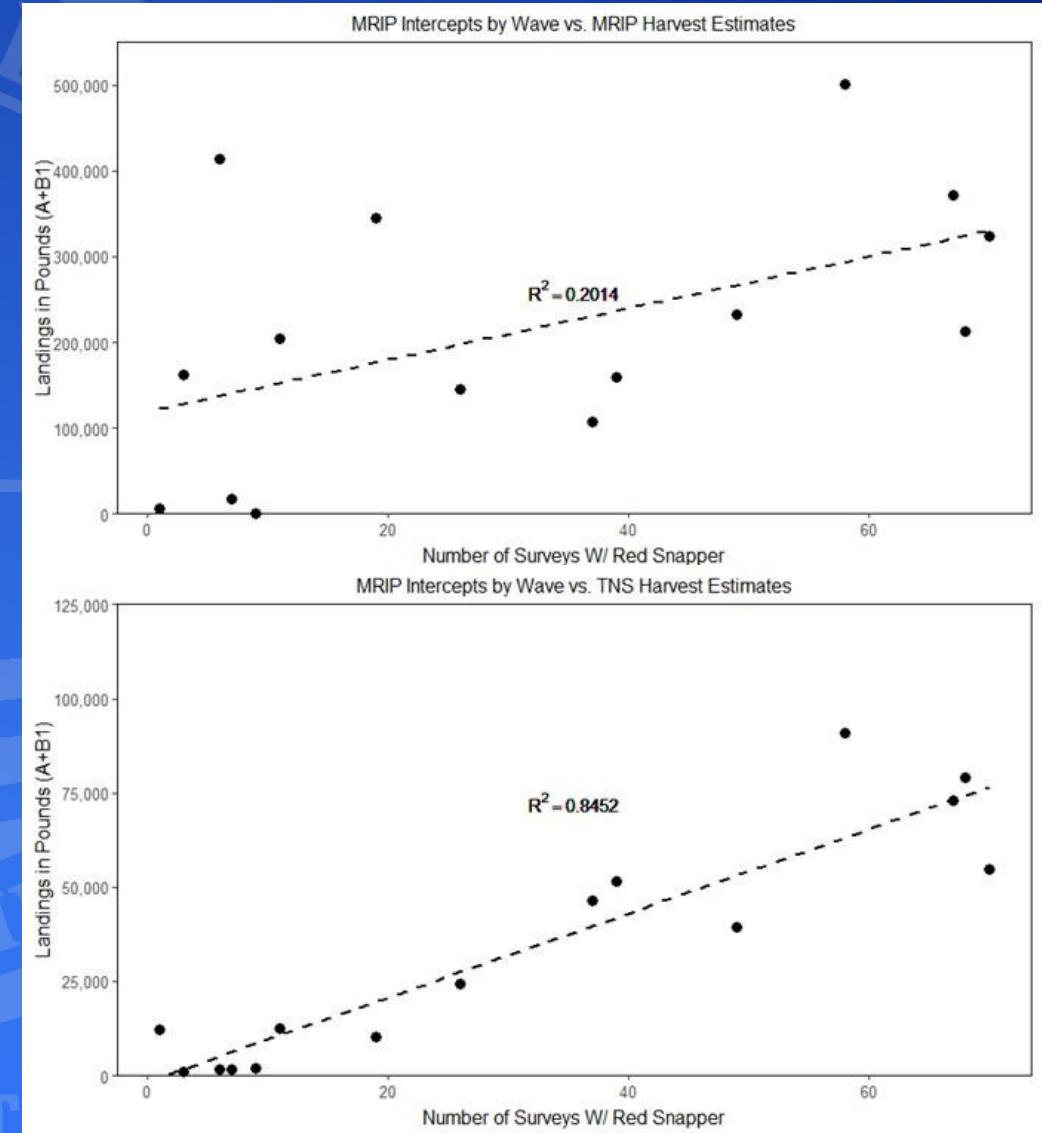
# Red Snapper Estimate Comparisons

- With the Tails n' Scales program, MS was able to conduct basic MRIP comparisons
  - While both surveys function differently, comparisons can still inform why and where differences occur
- At low sample size (# of surveys) large disparities occur when comparing harvest estimates (Figure)
  - Indicates low survey numbers contribute to volatile harvest estimates
- These occurrences are what drives Mississippi's concerns about calibration to common currency
  - Example – Harvest estimates from waves in which the season was open 5 days just as high as when season was open for 35+ days
  - Example – Wave 1 harvest estimates of 162,549 lbs and 414,272 lbs recorded when the Mississippi state season was closed. Two boats were intercepted that were transiting into LA when their season was open



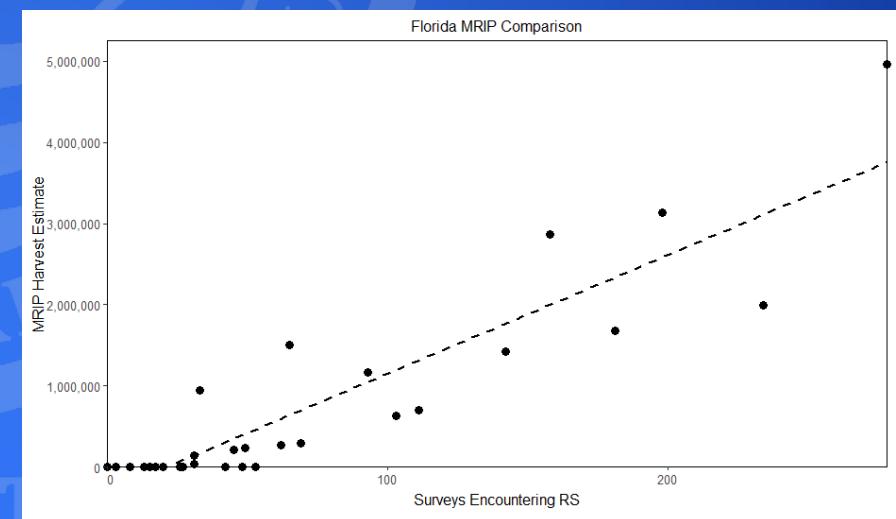
# Low Sample Size Issues

- Critical assumption – The APAIS survey (dockside) is representative of fisheries trends
  - There should be a distinct positive correlation between the number of surveys of a given species and its harvest estimate
  - Relationship difficult to infer when comparing MRIP estimates of harvest
  - Comparison of the number of MRIP surveys to TNS harvest estimates shows a distinct positive correlation
- This assumption must be presumed correct based on MRIP design



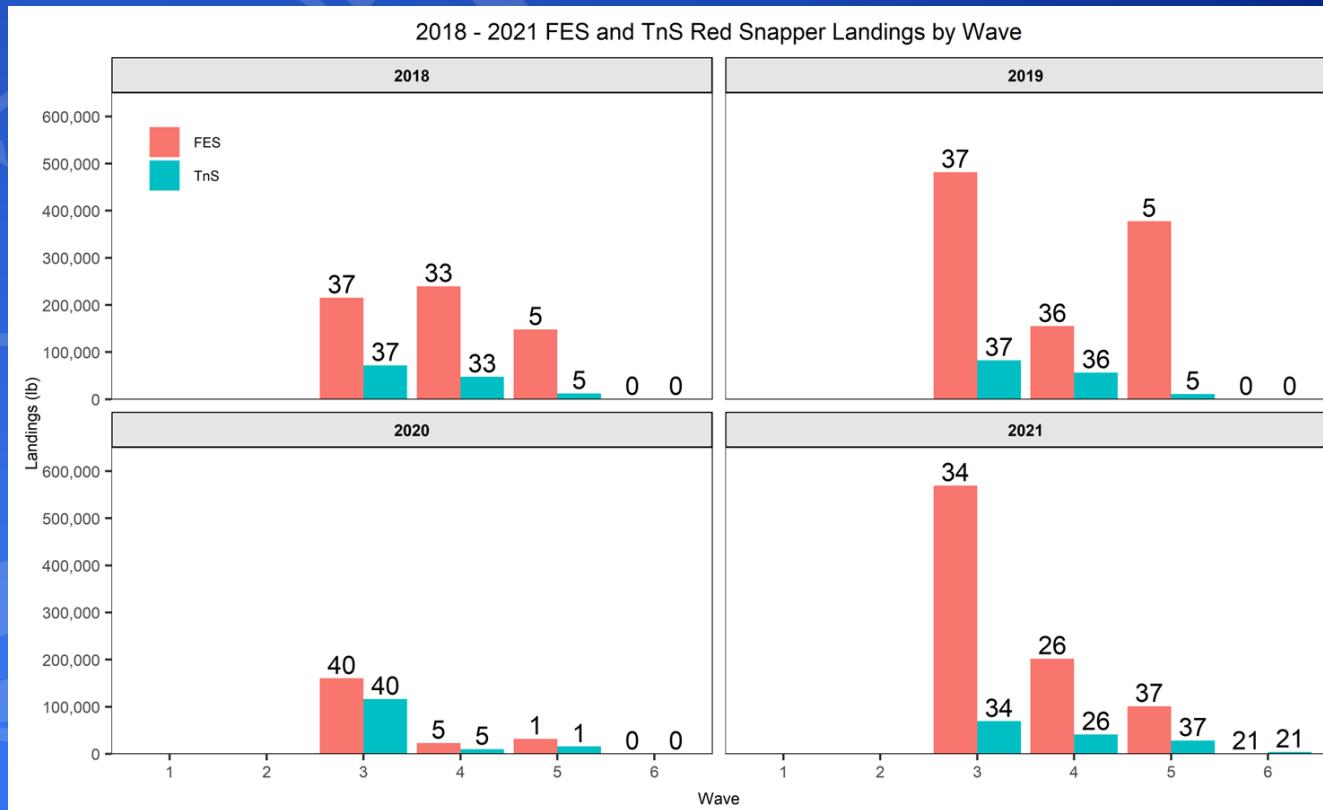
# Low Sample Size Issues

- Breakdown survey data from all states into specific species observations
- Compare them to the wave-specific harvest rate derived from MRIP
- Examine the observed relationship
- Species: Cobia, Gray Snapper, Gray Triggerfish, Greater Amberjack, King Mackerel, Lane Snapper, Red Drum, Red Snapper and Spotted Seatrout
- If assumption is correct
  - Those species with large sample sizes should show a discernable positive relationship
  - Small sample sizes should lead to lower estimates



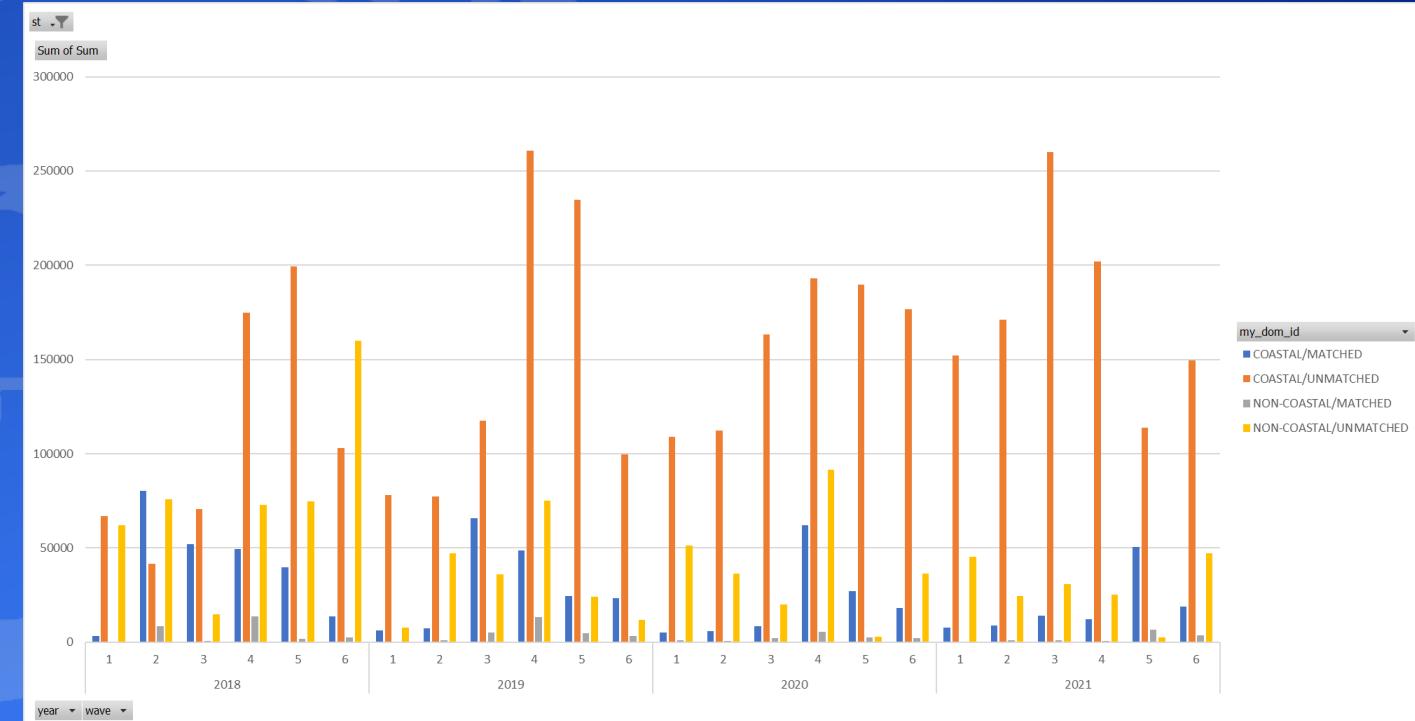
# MS Calibration Issues

- Current identified concerns
  - Low sample size waves
    - Subject to large disparities in estimates likely due to the amount of effort attributed to them
  - Shifting magnitude in Wave 3
    - Effort is the primary driver based on discussion with OST
    - Continued concern over the ratio of area fished that attributes the effort across strata



# Recent Discussions

- Concern over strata-specific distribution of effort
  - Coastal/Non-coastal matched vs. Unmatched
  - Does a more accurate license frame effect effort estimate?
- How might site distribution play a role in the ratio of effort across area
  - Selection of sites on exceptionally high traffic weekends near opening of season
  - Similar issues to low sample size waves
- Focused research for surveys
  - MS expresses willingness to fund state focused research for MRIP
  - Funds for researching private dock metrics, reporting bias, and abandoned trip proposal from OST
  - Continuing work with Statistical consultant on new estimation method and sensitivity analysis of estimation methods



# Outlook for Future Calibration

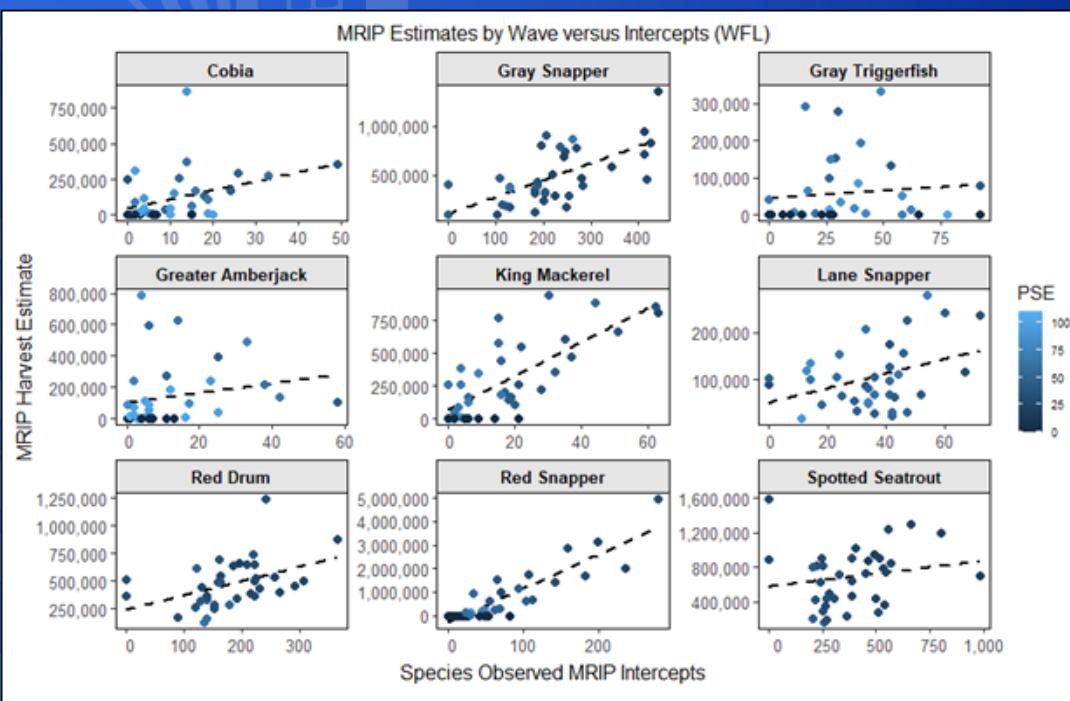
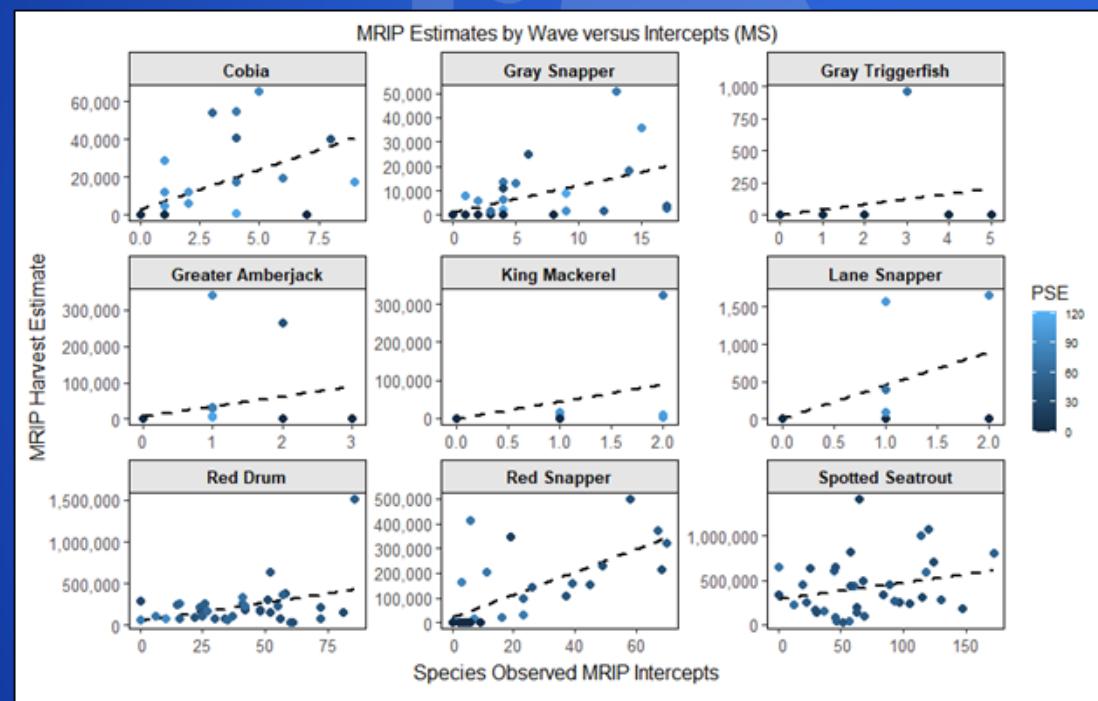
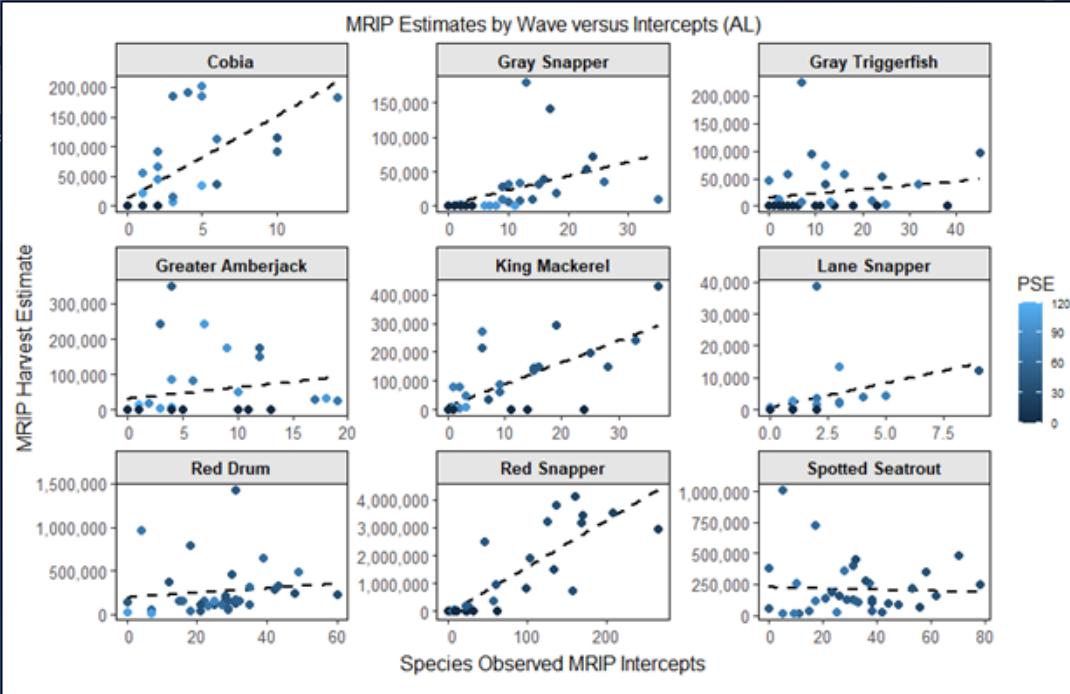
- Until the identified issues with MRIP in MS are addressed, including more years will not yield different results
- Case example – 2022 Preliminary estimates
  - Wave 3 – Second highest estimate in the entire time series of the modern fishery outside of a 1.2 million pound estimate in 2012
    - ~22,800 lbs per day
  - Wave 4 – Lowest wave 4 estimate (outside of zero) ever produced in the modern fishery
    - ~300 lbs per day

Estimate Status	Year	Wave	Common Name	Harvest (A+B1) Total Weight (lb)	PSE
FINAL	2010	NOVEMBER/DECEMBER	RED SNAPPER	5,720	26.8
FINAL	2011	MAY/JUNE	RED SNAPPER	5,022	74.2
FINAL	2011	NOVEMBER/DECEMBER	RED SNAPPER	342,908	78.2
FINAL	2012	MAY/JUNE	RED SNAPPER	1,969	94.7
FINAL	2012	JULY/AUGUST	RED SNAPPER	1,246,373	64.5
FINAL	2013	MAY/JUNE	RED SNAPPER	386,042	43.6
FINAL	2013	SEPTEMBER/OCTOBER	RED SNAPPER	300,387	66.4
FINAL	2014	MAY/JUNE	RED SNAPPER	17,665	69.4
FINAL	2014	JULY/AUGUST	RED SNAPPER	109,680	88.7
FINAL	2015	MAY/JUNE	RED SNAPPER	3,922	77.8
FINAL	2015	JULY/AUGUST	RED SNAPPER	95,301	55.2
FINAL	2016	JANUARY/FEBRUARY	RED SNAPPER	162,549	83.7
FINAL	2016	MAY/JUNE	RED SNAPPER	335,005	49.9
FINAL	2016	JULY/AUGUST	RED SNAPPER	156,678	41.2
FINAL	2016	SEPTEMBER/OCTOBER	RED SNAPPER	17,378	79.3
FINAL	2017	JANUARY/FEBRUARY	RED SNAPPER	414,272	72.5
FINAL	2017	MAY/JUNE	RED SNAPPER	395,787	48.5
FINAL	2017	JULY/AUGUST	RED SNAPPER	106,707	37.9
FINAL	2017	SEPTEMBER/OCTOBER	RED SNAPPER	6,436	102.4
FINAL	2018	MAY/JUNE	RED SNAPPER	215,936	33.6
FINAL	2018	JULY/AUGUST	RED SNAPPER	231,927	37.7
FINAL	2018	SEPTEMBER/OCTOBER	RED SNAPPER	204,767	72.6
FINAL	2019	MAY/JUNE	RED SNAPPER	533,472	34
FINAL	2019	JULY/AUGUST	RED SNAPPER	159,899	50
FINAL	2019	SEPTEMBER/OCTOBER	RED SNAPPER	344,984	20.5
FINAL	2020	MAY/JUNE	RED SNAPPER	171,908	38.4
FINAL	2020	JULY/AUGUST	RED SNAPPER	24,189	63
FINAL	2020	SEPTEMBER/OCTOBER	RED SNAPPER	32,892	77.9
FINAL	2021	MAY/JUNE	RED SNAPPER	569,817	52.5
FINAL	2021	JULY/AUGUST	RED SNAPPER	205,265	63.4
FINAL	2021	SEPTEMBER/OCTOBER	RED SNAPPER	82,588	78.2
PRELIMINARY	2022	MAY/JUNE	RED SNAPPER	786,920	40.9
PRELIMINARY	2022	JULY/AUGUST	RED SNAPPER	8,014	73.5
PRELIMINARY	2022	SEPTEMBER/OCTOBER	RED SNAPPER	98,592	84.4

# Discussion

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- While many of these figures show positive correlations, many are not distinct and some show concerning trends
- Greater Amberjack and Gray Triggerfish, for instance, shows large volatility in point estimates at lower survey numbers
  - This trend is particularly problematic for species undergoing strict management measures (along with ACLs) as it leads to increased restrictions and no effective way to evaluate how management measures impact fisheries harvest



# Examining Greater Amberjack

- Looking closer at the wave estimates over time, some trends emerge
  - Extreme volatility in Mississippi
  - Large scale shifts in magnitude of harvest for Alabama
  - Somewhat patterned, but variable harvest in Florida
- When these volatilities occur in the same year (2016 & 2018), it provides increased negative outlook on the stock which may not be representative of the fishery

